HUMANS UNDER THE CONDITIONS OF AUTONOMOUS EXISTENCE IN THE ARCTIC

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The person can appear under the conditions of autonomous existence in the Arctic owing to various circumstances. The history of polar navigation knows many cases when people remained in private with the Arctic after the loss of the ship, jammed by ices. The dramatic events happened to be in the life of "Zhanetta" and "Saint Anne", "Oat-flakes" and' Karluk" crews are among the most well-known. The name of the icebreaking steamship "Chelyuskin" is associated with a heroic behavior of the Russian people. On February 13, 1934 the ship jammed by ices in the Chukchi Sea sank, and there were a hundred and two people left among open spaces covered by ice.

The polar explorers headed by famous Russian scientist O.Yu. Schmidt organized the camp on the drifting ice. Only on April 13 the last members of Chelyuskin steamship - V.I. Voronin, a captain, and E.T. Krenkel, a radio operator, were evacuated from the camp.

Wherever people who suffer from different disasters occur - among ice in the high-altitude regions of the Arctic or in the snow-covered tundra, that is extremely low temperature that they have to contend with from the first minute [1]. The efforts to resist frost, the impact of low temperatures on an organism are the most important issues of autonomous existence of a person in the Arctic. The warmer the clothes are, the longer a person can sustain polar freezing temperatures. For this reason, Arctic clothes are made of the materials characterized by low heat conductivity and high air permeability. There is a direct dependence of time during which the human body keeps thermal comfort, on the value of ambient temperature and the heat-insulating properties of clothes. For example, the person dressed in flight overalls at a temperature of minus 5 ° will feel thermal comfort no more than half an hour. It takes the same amount of time, if the person is dressed in woolen underwear and a wadded jacket while the external temperature is minus 30 ° or he wears woolen underwear, a woolen sweater and a fur jacket with trousers at a temperature of minus 50 °. If a jacket is covered with a water-windproof fabric and supplied with a warm pad, the person will begin to freeze in 45-60 minutes. Thus, even the warmest clothes can provide positive thermal balance at negative temperatures of external environment over only a strictly limited period. Sooner or later heat loss will exceed heat production, and human organism will begin to freeze.

The people in distress should find shelter from rough weather, for the construction of which the most ideal building material is snow being at their disposal. It is easy to saw, and cut. It is possible for snow blocks to give any form without efforts, and to change the sizes "on the run".

The snow blocks do not slide because of their being sticky and, attached one to another, form a single monolith in 5-10 minutes. Furthermore, the main thing about the snow is that it is an excellent heat insulator because of the high content of the air (to 90%), filling the space between snow crystals. Thickness of snow cover in the Arctic is usually insignificant, only 25-90 cm. However, snow masses, moving under the influence of wind, form snow banks which occasionally may be one-two meters high. Their density is quite often so high that these barriers can withstand the weight of an track-laying tractor .

As a consequence, air temperature in snow shelters is usually by 15-20° lower than the air temperature outside. Moreover, as a result of short-term heating (3-4 hours) by a

stearin candle or tablets of dry fuel the air temperature in a snow cave was risen to 0°, and to minus 3° in an igloo, while the temperature outside reached only 18 - 27° below zero.

The experience has shown that an Eskimoan hut (igloo) is probably the most ideal snow shelter. For many centuries the igloo has served as the only winter dwelling of continental Eskimos. Knud Rasmussen who studied the life of Eskimos along the Great sledding path from the coast of Hudson Bay to Alaska for many years, wrote that sometimes these snow houses represented the real architectural complexes. "About twelve people could accommodate easily for the night in the main construction. This part of the snow house changed into a high portal, like the hall where people cleaned snow off before entering the living space. One more spacious light construction where two families settled was attached to the other side of the main house. We had enough fat, and there were about seven-eight lamps lit at a time; therefore, it was so warm inside these walls composed of white snow blocks that people could take pleasure from being scantily dressed" (Rasmussen, 1958) [2].

The person living under the conditions of autonomous existence is surely not interested in an excessive décor of his dwelling, but the constructed igloo will reliably protect him from wind and cold. There is a set of recommendations on the dimensions of an igloo, the optimal size of snow bricks as well as the equipment inside the house.

First of all, it is necessary to find an even site with dense, deep, not less than a meter, snow cover. Then by means of a rope to ends of which a peg is attached, a circle is drawn. This line will indicate the position of the first row of snow bricks. The diameter of a circle for the igloo will be chosen depending on the number of future inhabitants: it is 2,4 m for one person, 2,7 m if there are two people, and 3 m or 3,6 m – for three and four people respectively. The polar researchers, who have experienced the reliability of Eskimoan igloo, recommend cutting blocks which are 50 - 90 cm long, 40 - 50 cm wide, 10 cm thick [3].

If snow is insufficiently dense, it is possible to increase thickness of the block to 20 cm (Berman, 1963). Such a block weighs 20-40 kg depending on its size and density of snow. To move the block, it is cut into two parts which are 5-7 cm, and then, having put the tool under the basis, shake the block by easy movements.

For removal of breathing products and wastes of fatty lamp, candle and dry fuel burning there is an air vent in a dome. Opposite the entrance there is a sleeping bench composed of snow blocks which are 50 - 70 cm high. It is usually covered with tarpaulin, parachute fabric or an inflated lifeboat laid upside down.

The inflatable liferaft which is included in the emergency package of many aircrafts can be a reliable shelter which hardly ever requires great physical efforts when being built. It is possible to increase the temperature inside the raft from minus 20° to 1° above zero using such means of heating as 2 stearin candles when it is 25° below zero outside.

The temperature inside the raft can increase if a layer of snow blocks insulates the raft from the effect of cold air coming outside. For heating, cooking, thawing of snow and boiling of water people may use various means such stearin candles and tablets of dry alcohol, fat of hunted seals, walruses, polar bears, dwarfish trees; peat turf; dry grass; driftwood (trunks and large branches of trees which were cast ashore). The peat turf is previously cut in small briquettes and dried, and the dry grass is tied in bunches.

The fat-burning lamp is the most convenient for heating a small shelter. Its design is simple. At the bottom of a can there is an opening through which a wick made from the strip of a bandage, a handkerchief or other fabric which is previously moistened or rubbed

with fat is lowered down. The slices of fat are placed at the bottom of a can, and melting fat flows down keeping the fire burning.

Thus, in case of autonomous existence in the Arctic a person must make a rational use of everything that the nature and the surrounding environment provide him to his advantage. To survive in a rough climate a person must be physically fit and possess analytical skills as well as be ready to make decisions independently and be emotionally stable.

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HISTORY OF DRIFTING STATIONS

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A drifting station is a scientific research station on a drifting ice floe in deep-water parts of the Arctic Ocean [1].

Stations conduct comprehensive, year-round research in oceanography, glaciology (ice physics and dynamics), meteorology, aerology, geophysics (ionospheric and magnetic field observations), hydrochemistry, hydrophysics and marine biology.

A drift station is a term used to describe a temporary or semi-permanent facility built on an ice floe. During the Cold War the Soviet Union and the United States maintained a number of stations in the Arctic Ocean for research and espionage, the latter of which were often little more than quickly constructed shacks [2].

Norwegian polar explorer Fridtjof Nansen was the first to come up with the idea of establishing research stations on drifting ice floes in the central Arctic after returning from his famous expedition (1893-1896) when the first drift was carried out on board the Fram ship frozen in heavy packed ice.

Canadian polar explorer Vilhjalmur Stefansson made the first attempt to set up a drifting station. In March 1918, an expedition led by Starker Storkerson camped on an ice floe with an area of over 400 sq km several hundred miles from Alaska. During the drift, the polar explorers conducted hydrological and meteorological observations. In November, the expedition safely returned to the mainland.

In the Soviet Union, the idea of setting up a station near the North Pole was advocated by Academy of Sciences Member Otto Schmidt and Professor Vladimir Wiese (Vize), who embraced and developed Nansen's ideas.

The first plan of establishing a polar research station, proposed by Vize, was considered back in 1929. However, no practical steps were taken in this area until 1935. On May 1, 1937, airplanes of a high-latitude air expedition landed on an ice floe near the geographical North Pole, delivering the station team and supplies.